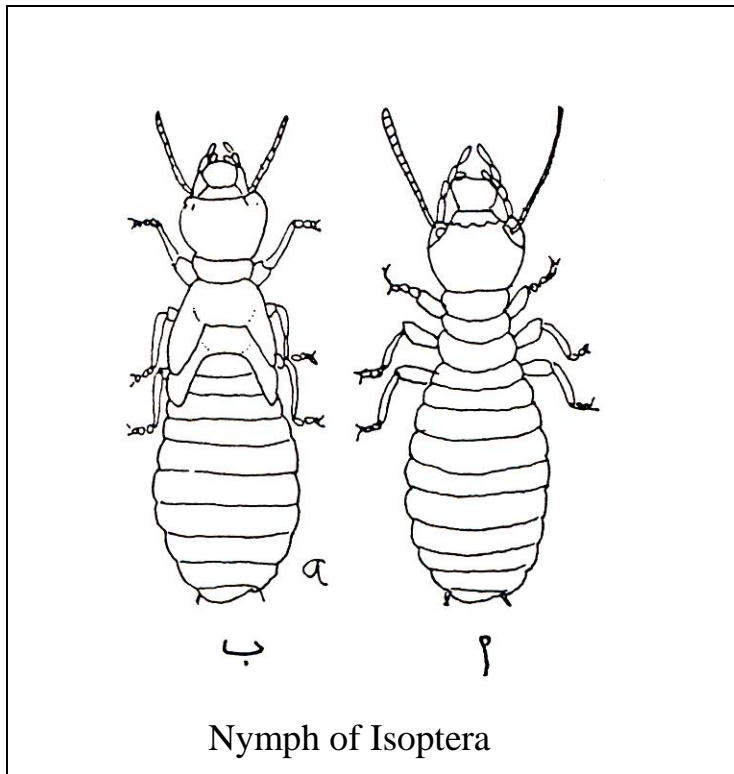
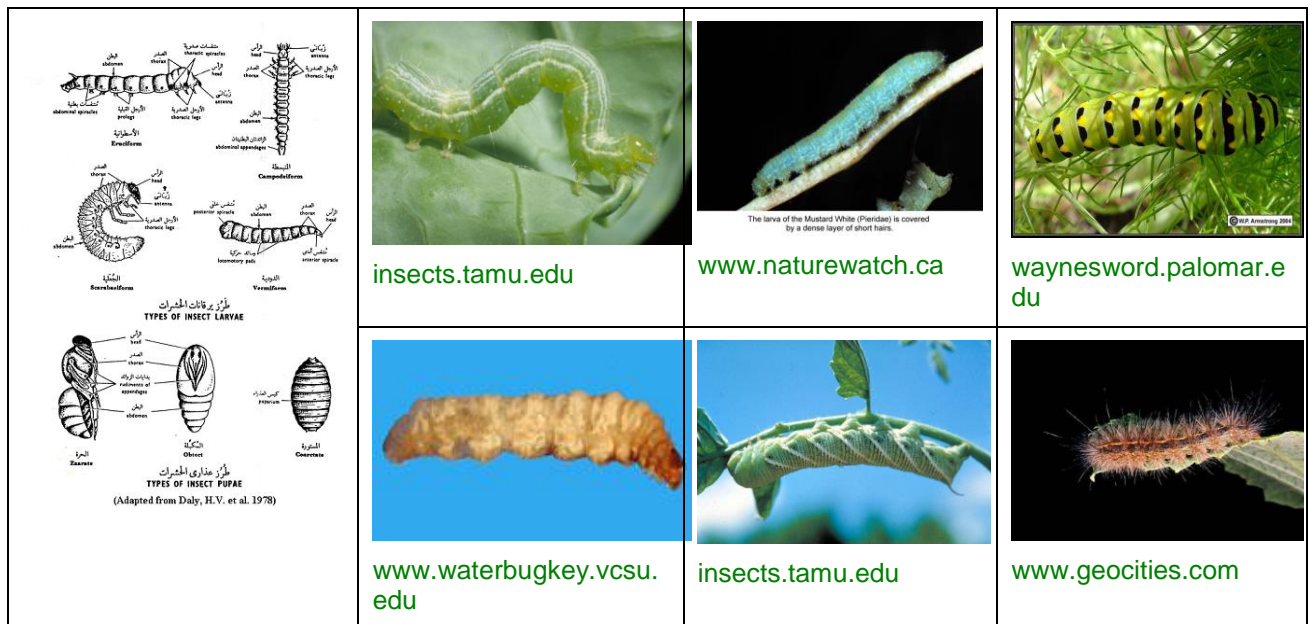


Immature insects

More frequently than not, immature stages of insects are more damaging than the adults. It is important to learn to recognize the immature stages at least to order. Insects undergoing simple (Incomplete, gradual) Metamorphosis are called nymphs; those with complex (complete) metamorphosis are called larvae.



- 1-- **Nymphs**-- resemble the adults they will later become .
- a-- 3--pairs of segmented thoracic legs
- b--wing pads (if adult has wings)
- c-- compound eyes (if adult has them).
- d-- Usually feed along with adults
- e-- same type of mouthparts as adults.
- f-- Usually no resting stage between las nymphal instar and adult .



- a.-- 0--3pairs of thoracic legs (may also have unsegmented, fleshy pairs of Abdominal legs called prolegs).
- b-- no evidence of wings(wings develop internally).
- c.--never have compound eyes (may have one or more ocelli)
- d.-- may feed on something entirely different from adult.
- e--frequently have entirely different mouthparts from adults
- f--usually have arresting stage (pupa) between last larval instar and adult.

Note: Characters distinguishing orders for nymphs are very similar, if not identical to those for adult forms. The only thing you can not use is the wings. Once you are familiar with adults, most nymphal forms are easily recognized.

Insect's larvae

Larval characters:- are entirely different from those used for adult insects .

It is as though you are studying an entirely different group of animals .The most important characters used in larval classification to order are: --

- 1-- Distinct head present or not.

2-- Thoracic legs present or not (0--3 pairs)

3-- Spiracle arrangement (especially diagnostic for Diptera)

4-- Prolegs (presence, absence, arrangement).

5-- Mouth parts -variable, unusual in Neuroptera, especially wide variation within the order Diptera).

Some distinguishing characteristics of larvae :

A----.LEPIDOPTERA--- all are called "caterpillars ". 3 pairs thoracic legs , spiracles on each of first 8 abdominal segments ,3--6 pairs of ocelli 2--5 pairs of abdominal prolegs each bearing distinct small hooks called crochets; typical arrangement of prolegs is 1 pair on abdominal segments 3,4,5, 6,and 10 chewing mouthparts throughout the order .

B-COLEOPTERA--many forms ("grubs "wireworms" "root worms"mealworms"etc) usually have 3 pairs of thoracic legs; spiracles on each of first 8 abdominal segments; usually a group of ocelli or more; no prolegs; chewing mouthparts throughout the order.

C--DIPTERA---many types but the most distinctive thing about them is that there is never a series of abdominal spiracles (either caudal pair caudal and cephalic pair) never have thoracic legs and seldom have prolegs; ocelli present or absent; mouthparts range from modified chewing type to " mouth hooks"

1-- Lower Diptera (e.g. mosquito)--A distinct head present; frequently aquatic; mouthparts are modified chewing and operate horizontally, spiracles sometimes on a respiratory siphon. Gills frequently present.

2--Higher Diptera (e.g. house fly)--No distinct head present; usually terrestrial; mouth parts in the form of two vertically operating" mouth hooks " usually pair of conspicuous caudal spiracles and a pair of small, inconspicuous cephalic spiracles, This type of larvae is called a maggot.

D-HYMENOPTERA--2distinct types. All larval Hymenoptera have a distinct head; chewing mouthparts; spiracles on abdominal segments 1---8.1--Sawflies --resemble caterpillars but have greater number of prolegs (6---8 pairs) which lack crochets; typical arrangement of prolegs is on abdominal segments 2--8 and 10: a single pair of ocelli present.

2---other neither Hymenoptera (ants, bees, wasps) .No legs nor prolegs; usually grub like and rather helpless. Most of these are social or sub social or are provided with food in some way by the parent, Many parasites are in this group .

E---NEUROPTERA--(ant lions, aphid lions).In these 2 families the mandibles and maxillae are greatly elongated, sickle--shaped structures which fit together to form a blood--sucking channel between them .the larvae are very active with 3 pairs of segmented legs .

F.---SIPHONAPTERA---fleas. Larvae are small (less than 10mm.)..White with a distinct head and chewing mouthparts; spiracles inconspicuous; pair of shortsubanal processes at caudal end of last 10th segment, long hairs present oeach thoracic and abdominal segments, arranged in a line around each segment.

Key to the immature stages of the insects orders of major Economic Importance.

this key does not include the following minor orders:-

Protura, Diplura, Collembola, Ephemeroptera Odonata,Plecoptera, Megaloptera ,Trichoptera, Emoloptera ,Psocoptera ,and Mecoptera ,)

1a - Nymphs --general appearance and mouth parts similar to adults, may have compound eyes, thorax of older nymphs may have wing pads tarsus usually composed of more

Than 1 segment. -----
-----2.

1b-- Larvae--general appearance unlike adults,compound eyes and wing pads lacking, ocelli may be present singly or in groups, tarsuswith1segment or none-----

-----10 .2a --chewing mouthpart,sometimesconcealed in head -----3.

2b--Sucking or rasping mouthparts,and if beak is lacking, the body is flattened7.

3a -- --Antennae composed of at least 7segments. -----
---4.

3b .--Antennae composed of fewer than 7segments,body depressed.
(small external parasites on birds and mammals). -----

Mallophaga

4a . --Abdomen ending in a pair of forceps-like appendages-----
Dermoptera.

4b.-- Abdomen not ending in forceps--like appendages .-----
----5.

5a.-- Body often scaly , 3 long conspicuous tail -like appendages .

(Bristle tails)-----
Thysanura.

5b.- Abdomen lacks 3 long tail—like appendages .-----
---6 .

6a--Head vertical to body, i.e. Perpendicular to axis of body.
(nymphs of cockroaches, crickets, grasshoppers, etc.) -----
Orthoptera

6b -- Head horizontal, I.e. In same plane as body.Small, white nymphs.
Usually in colonies (termites) -----
Isoptera .

7a.- --Sucking mouthparts, but stylets are withdrawn into head, head
tendsto be pointed in front, body flattened,tarsus 1—segmented with one
claw .externalparasites of mammals.-----
--Anoplura.

7b.-- Visible beak present .-----
----8.

8a.-- Beak small ,conical ,and without segmentation-----
thysanoptera .

8b. -- Beak projects from head ,and is segmented .-----
----- 9.

9a .Beak arises from front of head , or at least basal portion of first
beak segment originates at front of head -----
-Hemiptera.

9b.--Beak arises from rear of ventral side of head, often protruding
between front coxae-----
Homoptera.

10a.--Thorax bearing 3pairs of segmented legs.-----
11 .

10b-- Thorax lacks 3pairs of segmented legs .---- -----14.

11a--. Abdomen without appendage, \ except possibly asingle pair at
the
posterior end -----
12 .

11b--.Abdomen bearing from 2to 10 pairs of unfermented ventral
appendages in the form of fleshy prolegs , or group of crochets ..-----
--- ----- 13 .

12a.—Mandibles and maxillae are sickle--shaped and fit tightly to one
another, the grooves on the depressed surface forming a food channel

(Aphidion , Antlion)-----
Neuroptera.

12b.-- Mouth parts of normal chewing type . description no as above .---

Coleoptera.

13a.-- Prolegs bearing crochets, head with 2--6 ocelli on each side.(caterpillars) -----

-----Lepidoptera .13b.-- Prolegs without crochets , oneocelli on each side of head.(Saw-flies).- -----

-----Hymenoptera.

14a.-- With a distinct head and well--developed chewing mouth parts--
----15.

14b.-- Head reduced or apparently absent , mouth parts reduced and specialized -----
-----18.

15a -- Last pair of spiracles much longer than any other pair, sometimes open through a tube , or the tip of the abdomen bears small gills (mosquito larvae , midge larvae,etc) -----
-----Diptera .

15b.--Last pair of spiracles not distinctly larger than the others, lacks gills. -- 16.

16a. -- Head and mouthparts usually hard and dark --colored, contrasting with thorax. -----
-Coleoptera.

16b.-- Head and mouthparts light--colored, not sharply contrasting with thorax-----

-----17a.-- Body usually fleshy ,rub--like and curved, spines and hairs generally absent on thorax and abdomen (Bee, Ant, Wasp, larvae) -
-----Hymenoptera.

17b.—Body cylindrical and straight, or only slightly curved, with transverse row of prominent hairs on each segment of thorax and abdomen. (Flea larvae) -----
-----0 --- Siphonaptera.

18a.—Posterior end of abdomen with a pair of large spiracles on spiracular plates, usually located close together, mouthparts consisting of a pair of hooves that operate vertically (maggots) .-----

----- Diptera .18b.-- All spiracles small and similar (often hard to see),mouthparts operate horizontall(mouthparts often hard to see)(larvae of bees , ants, wasps).-----
-----Hymenoptera .

References

- Daly, H.V., J.T. Doyen, P.Q. Ehrlich. (1978) Introduction to Insect Biology and Diversity. McGraw-Hill. New York.
- Borror, D.J., D.M. DeLong, and C.A. Triplehorn, (1981) An Introduction to The Study of Insects. 5th ed. Saunders. Philadelphia
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